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APPLICANT : SHIN MEIWA IND CO LTD;

INVENTOR : KITAGAWA YUJI;

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TITLE : METHOD FOR CONTROLLING THICKNESS OF THIN FILM

$$T(d) = \frac{4n^2 n_g}{n^2(1+n_g)^2 + (1-n^2)(n_g^2 - n^2)\sin^2(2\pi nd/\lambda)}$$

ABSTRACT : PURPOSE: To control not only limited film thicknesses but also film thicknesses over a wide range including the thicknesses of thinner films and the integer times thereof by utilizing the phenomenon that a change in the reflectivity or transmittivity of the light to be used has a singular point as forming of thin films.

CONSTITUTION: The T'' (d) obtd. by differentiating, twice, the transmittance T of the light through the thin film having the thickness (d) expressed by equation (where λ: the wavelength of the light to be used as a reference, (d): the thickness of the thin film to be formed, (n): the refractive index of the light of the thin-film forming material, ng: the refractive index of the light of a monitor substrate) with respect to the thickness (d) is made into zero and the film thickness dh to become the inflection point of the transmittance or reflectivity is determined. The wavelength $\lambda h=\lambda^2/mdh$ is determined from this film thickness dh, integer (m), etc. While the thin film is formed, light is projected to the substrate and the transmittance or reflectivity is measured. The value obtd. by differentiating this transmittance or reflectivity twice with respect to the thickness (d) is observed and the formation of the thin film is stopped where the value attains zero.